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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/760,033	01/16/2004	Clive K. Tang	873.0135.U1(US)	8506

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EXAMINER	
MURPHY, RHONDA L	

ART UNIT	PAPER NUMBER
2667	

DATE MAILED: 02/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/760,033	TANG ET AL.	
	Examiner	Art Unit	
	Rhonda Murphy	2667	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 November 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,11,12,19-26,29,30 and 41-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,11,12,19-26,29,30 and 41-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This communication is responsive to the amendment filed on 11/14/05. Accordingly, claims 10, 13-18, 27-28 and 31-40 were previously canceled in a preliminary amendment, and claims 1-9, 11-12, 19-26, 29-30, and 41-52 are currently pending in this application.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6, 12, 19, 21-24, 30, 41-48 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olszewski (US 2003/0223354) in view of Larsson et al. (US 2004/0233918) and Maltsev et al. (US 2005/0152466).

Regarding claims 1 and 19, Olszewski teaches a method of transmitting data in a multi-carrier system to a set of M users comprising the steps of: providing a transmitter system with N sub-carriers divided into G groups (page 3, paragraph, paragraph 29; groupings of sub-channel signals), N and G each being integers greater than one (it is known in the art that multi-carrier systems include multiple sub-carriers divided into groups, in which the number of sub-carriers and groups are greater than one); determining a group SNR that is calculated using an effective channel function for each

user in each group of sub-carriers (pages 5-6, paragraphs 92-93; SINR measurement of individual or groups of sub-channel signals).

Although Olszewski teaches a group SNR, Olszewski fails to explicitly disclose an instantaneous group SNR. However, it is known in the art to instantaneous SNR measurements are taken at a particular interval.

Furthermore, Larsson teaches a multi-carrier system utilizing an instantaneous SNR (page 3, paragraph 27; page 8, paragraph 124). In view of this, it would have been obvious for to perform Olszewski's method to using instantaneous sub-carrier SNR measurements.

Olszewski further teaches, for each user and in each group of sub-carriers, using the SNR as a metric for resource allocation at the transmitter (page 5, paragraph 92; SINR measurement of individual or groups of sub-channel signals...Adaptive power control can be applied to each subchannel signal depending on the SINR measurements of individual channels...).

Olszewski fails to explicitly disclose an equivalent single sub-carrier. However, Maltsev teaches an equivalent single sub-carrier as a metric for resource allocation at the transmitter (page 3, paragraph 29; page 4 paragraph 48; page 5, paragraph 49; mean effective subcarrier).

In view of this, it would have been obvious to one skilled in the art to modify Olszewski's method, by incorporating Maltsev's equivalent single sub-carrier for the

purpose of allocating power to the combination/group of subcarriers and increasing or decreasing the power level in order to optimize channel capacity.

Regarding claims 2 and 44, the combined system of Olszewski, Larsson and Maltsev teach the same limitations described above in the rejection of claims 1 and 19. Olszewski further teaches at least one MC-CDMA receiver (page 3, paragraph 31; page 5, paragraph 72); and a demodulator for demodulating the received data (page 3, paragraph 31; it would have been obvious to for the demodulator to correspond to the allocated resources for demodulating the received data, in order to properly demodulate and recover the received data).

Regarding claims 3 and 45, Olszewski further teaches user data bits modulated with a modulation scheme corresponding to that user's group SNR (page 5, paragraph 92) and spread in frequency over said sub-carriers belonging to that user's group (page 5, paragraph 92).

Regarding claims 4, 22 and 46, the combined method of Olszewski, Larsson and Maltsev teach the same limitations described in the rejection of claims 1, 5 and 19. Olszewski further teaches switching thresholds to determine bit allocations (page 6, paragraph 97-98). The process of comparing SNR with switching thresholds to determine bit allocations, and modulating the carrier with a specified number of bits is known in the art. Given the instantaneous group SNR taught by Olszewski and Larsson, and the equivalent sub-carrier taught by Maltsev, it would have been obvious to one skilled in the art to compare the instantaneous group SNR with switching thresholds to

determine bit allocations for the equivalent sub-carrier, and further modulate the equivalent sub-carrier with the corresponding number of data bits, for the purpose of modulating the equivalent sub-carrier with the appropriate scheme to optimize channel performance.

Regarding claims 5 and 47, the combined system of Olszewski, Larsson and Maltsev teach an instantaneous group SNR and an equivalent sub-carrier. Olszewski further teaches a modulation scheme corresponding to the users group SNR (page 6, paragraph 97). Furthermore, bit modulation, calculations of bit and power allocation, is well known in the art.

Regarding claims 6 and 48, the combined system of Olszewski, Larsson and Maltsev teach an instantaneous group SNR and an equivalent sub-carrier. It would be obvious for the instantaneous group SNR to be regarded as the instantaneous SNR of an equivalent single sub-carrier to the group, since the instantaneous group SNR represented by Olszewski and Larsson, combined with the equivalent sub-carrier of Maltsev provides for a single equivalent sub-carrier representing the instantaneous SNR of the sub-carriers within the group.

Regarding claim 12, the combined method of Olszewski, Larsson and Maltsev teach the same limitations described in the rejection of claim 4. Olszewski further teaches calculating for each user an effective channel function (pages 5-6, paragraphs 92-93); calculating from said effective channel function a group SNR of the sub-carriers in said

effective channel function (pages 5-6, paragraphs 92-93; SINR measurement of individual or groups of sub-channel signals).

Regarding claim 21, Olszewski further teaches a transmitter in which the modulator modulates data bits with a modulation scheme corresponding to said group SNR (page 5, paragraph 92), and the transmitter further comprising a spreader for spreading the unmodulated data bits in frequency over said sub-carriers belonging to said group (it is known in the art that spreaders spread unmodulated data bits over sub-carriers).

Regarding claim 23, the combined method of Olszewski, Larsson and Maltsev teach the same limitations described in claim 5. Additionally, the process of calculating bits and power allocation inherently includes calculating circuitry.

Regarding claim 24, the combined method of Olszewski, Larsson and Maltsev teach the same limitations described in claim 6. Additionally, the process of calculating inherently includes calculating circuitry.

Regarding claim 30, Olszewski teaches the circuitry for calculating further calculating, for each user, said effective channel function and said group SNR of the sub-carriers in said effective channel function (page 5, paragraph 72).

Regarding claim 41, Olszewski teaches a transmitter disposed in a mobile station (page 6, paragraph 97). Furthermore, it is known in the art that transmitters are disposed in mobile stations.

Regarding claim 42, Olszewski teaches a transmitter disposed in a base station of a cellular communication system (page 6, paragraph 97). Furthermore, it is known in the art that transmitters are disposed in a base stations.

Regarding claim 43, the combined method of Olszewski, Larsson and Maltsev teach the same limitations described in claims 1 and 19. Furthermore, Olszewski teaches a program of machine-readable instructions, tangibly embodied on an information bearing medium and executable by a digital data processor, to perform actions directed toward transmitting data in a wireless multi-carrier spread spectrum communication system (page 6, paragraph 93; software within a programmable digital signal processor).

Regarding claim 51, Olszewski further teaches user data bits for each user in each group of modulated sub-carriers are modulated by a modulation scheme corresponding to the user's group SNR (page 6, paragraph 97), then spread with a spreading code associated with that user (page 6, paragraph 99), and loaded into the sub-carriers of the user's group (page 6, paragraph 97).

3. Claims 7-8, 25-26, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olszewski, Larsson and Maltsev as applied to claim 1 above, and further in view of Sadri et al. (US 2005/0032514).

Regarding claims 7, 25 and 49, Olszewski teaches switching thresholds but fails to explicitly disclose groups of sub-carriers with first and second modulation schemes.

However, Sadri teaches groups of sub-carriers having a group SNR below a switching threshold are not modulated (page 4, paragraph 46); at least one group of sub-carriers having a first group SNR above said switching threshold is modulated with a first number of data bits according to a first modulation scheme (page 4, paragraphs 43-49); and at least one group of sub-carriers of said G groups having a second group SNR next above said first group SNR is modulated with a second number of data bits according to a second modulation scheme (page 4, paragraphs 43-49).

In view of this, it would have been obvious to one skilled in the art to modify Olszewski's method by applying modulation schemes according to switching thresholds, for the purpose of optimizing channel performance by utilizing a particular coding scheme.

Regarding claims 8, 26 and 50, Olszewski teaches a switching threshold, however, fails to explicitly disclose a switching threshold between at least two SNRs is chosen to satisfy a performance criterion of a system.

Sadri teaches a switching threshold between at least two SNRs is chosen to satisfy a performance criterion of a system (page 4, paragraph 45).

In view of this, it would have been obvious to one skilled in the art to modify Olszewski's method by selecting a switching threshold between at least two SNRs, for the purpose of optimizing channel performance by utilizing a particular coding scheme.

4. Claims 9, 11, 20, 29 and 52 rejected under 35 U.S.C. 103(a) as being unpatentable over Olszewski, Larsson and Maltsev, and further in view of Subramanian et al. (US 2001/0031014).

Regarding claims 11, 29 and 52, the combined method of Olszewski, Larsson and Maltsev teach the same limitations described in the rejection of claims 1 and 19. Furthermore, Subramanian teaches a step of adding the chips from all users synchronously across all the sub-carriers in said G groups, on a sub-carrier-by-sub-carrier basis and then transmitting an OFDM symbol formed by the addition of said chips (page 3, paragraph 30).

In view of this, it would have been obvious to one skilled in the art to modify Olszewski, Larsson and Maltsev method by adding chips synchronously on a sub-carrier by sub-carrier basis and transmitting an OFDM symbol formed by the addition of chips, for the purpose of transmitting a group symbol over the multi-carrier system.

Regarding claim 9, Olszewski further teaches user data bits for each user in each group of modulated sub-carriers are modulated by a modulation scheme corresponding to the user's group SNR (page 6, paragraph 97), then spread with a spreading code associated with that user (page 6, paragraph 99), and loaded into the sub-carriers of the user's group (page 6, paragraph 97).

Regarding claim 20, the combined system of Olszewski, Larsson, Maltsev and Subramanian teach the same limitations described above in the rejection of claims 2 and 44.

Response to Arguments

5. Applicant's arguments with respect to claims 1-9, 11-12,19-26, 29, 30 and 41-52 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rhonda Murphy whose telephone number is (571) 272-3185. The examiner can normally be reached on Monday - Friday 8:00 - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (571) 272-3179. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rhonda Murphy
Examiner
Art Unit 2667

RM

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TECHNOLOGY CENTER 2600

2/6/04